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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,886	12/04/2003	Nitendra Rajput	JP920030180US1	8810

7590 04/29/2008

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EXAMINER	
COLUCCI, MICHAEL C	

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
04/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/727,886	RAJPUT ET AL.	
	Examiner	Art Unit	
	MICHAEL C. COLUCCI	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal Brief filed on 01/03/2008, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The claimed invention is directed to non-statutory subject matter. Claims 8 and 10-15 disclose a "computer program product" with no description or clear support of a computer program product positively disclosed in the specification. Therefore, with no

disclosure of a computer product within the specification, a computer program product can be interpreted as a computer program, which does not fall under one of the statutory categories under 35 USC 101 as patent eligible subject matter, where computer program or computer program product does not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Bahl et al., "A tree-based statistical language model for natural language speech recognition" (hereinafter Bahl) in view of Kantrowitz US 6292772 B1 (hereinafter Kantrowitz).

Re claims 1, 8, and 9, Bahl teaches storing word equivalence probabilities relating to words of a first language and words in at least one other language (Page 1001 Col. 2);

generating a monolingual word history in the first language based upon a mixed language word history and using the stored word equivalence probabilities, wherein said mixed language word history comprises words in said first language and words in said

at least one other language, and wherein said mixed language word history and said monolingual word history each comprise a history of previous words in a sentence-based word sequence (Page 1001 Col. 2);

generating monolingual next word hypothesis probabilities (Page 1002 Col. 2) in the first language based upon the monolingual word history (Page 1001 Col. 2), wherein said monolingual next word hypothesis probabilities predict a next word in said word sequence (Page 1006 Col. 1 paragraphs 1-3);

determining a probability of a next word (Page 1002 Col. 2) in a mixed language expression based upon the monolingual next word hypothesis probabilities and the stored word equivalence probabilities (Page 1001 Col. 2), wherein said probability of said next word predicts a next word in said mixed language expression (Page 1006 Col. 1 paragraphs 1-3)

However, Bahl fails to teach a method for language modelling of mixed language expressions (Kantrowitz Col. 6 lines 7-64)

Bahl teaches that all current Japanese word processing systems require the user to explicitly switch from a Japanese mode into an English mode. The same is true of other foreign language word processing systems, where the user must explicitly state the target language. The present invention eliminates this step, allowing the user to type in English or Romaji as needed, with the system automatically distinguishing between the two and converting the Romaji to Kanji as necessary. In a mixed-language document, this regular expression can be used to select the appropriate dictionary and thesaurus for use with the word. It can also be used to select the appropriate spelling

correction and grammar correction algorithms. Kantrowitz also teaches the method of recognizing the language of a single word has applications to spelling and grammar correction (e.g., identifying the appropriate language resources on a document, paragraph, sentence or even individual word basis), the automatic invocation of transliteration software based on the language of the words (e.g., automatic ASCII to Kanji substitution without requiring the user to explicitly switch into a Kanji mode), the automatic invocation of appropriate machine translation tools when the document's language is different from the user's native tongue(s), the use of document language identification to eliminate from database or web search results any documents which are not written in the user's native languages and the automatic identification of user-appropriate languages for the user interface.

Additionally, Kantrowitz teaches that the present invention determines whether or not a word is in the lexicon of a specific language. It is possible that a word may satisfy the recognizer (statement of n-gram patterns) for more than one language, using multiple parallel recognizers for specific languages, we can identify the languages to which the word belongs. If a word matches several recognizers, one can either weigh each language equally or use the language of the words on the left and right to disambiguate the possibilities. For example, if both neighboring words are English and the current word is recognized as being both English and Japanese, the current word would be deemed to be English. On the other hand, if one of the neighboring words was Japanese, both English and Japanese would be reported.

Further, Kantrowitz teaches that the invention goes beyond the state of the art by being able to identify the language of individual words in isolation with high accuracy. The accuracy in identifying the language of individual words typically is equal to that of whole-document language identification systems. When the language identification of individual words is combined for all the words in a document, the overall accuracy significantly exceeds that of whole-document systems. Moreover, the ability to identify the language of individual words permits document processing resources to be applied on a word-by-word basis. For example, it allows for the spelling correction of a mixed-language document, allowing the spelling correction software to select the appropriate language for each word. It also allows the automatic substitution of Kanji for Romaji in mixed Japanese-English documents, without requiring the user to explicitly switch from one language to another. This invention is not limited to comparing only two languages. First, a collection of regular expressions for pair wise distinguishing languages can be used to identify the language of a word. Moreover, lexicons of multiple languages could be merged to distinguish, for example, English words from the words present in any one of a dozen other languages.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention using word histories and probabilities for statistical purposes using parallel identifiers for specific languages relative to a lexicon/corpus, where the next word in a mixed language text can be predicted. Using word prediction and probabilities relative to a mixed language allows for an interface that enables a multilingual user to input a language that may have two or more mixed languages. The ability to model a

mixed language text allows for multiple languages in one text to be distinguished from one another, without translation from one language to another, where automatic substitution of words occurs through the use of various lexicons. Additionally, lexicons may be merged to allow for an increased capability of modelling additional languages mixtures for the purpose of predicting a more versatile selection of adjacent words in a text.

Re claims 2, 10, and 16, Bahl teaches the method as claimed in claim 1, further comprising the step of summing products of word equivalence probabilities with respective monolingual next word hypothesis probabilities (Page 1002 Col. 2).

Re claims 3, 11, and 17, Bahl teaches the method as claimed in claim 1, wherein the monolingual next word (Page 1002 Col. 2) hypothesis probability is a statistical language model (Page 1001 Col. 1).

Re claims 4, 12, and 18, Bahl fails to teach the method as claimed in claim 1, further comprising the step of converting a mixed language word sequence to a monolingual word sequence using word equivalence probabilities (Kantrowitz Col. 6 lines 7-64).

Bahl teaches that all current Japanese word processing systems require the user to explicitly switch from a Japanese mode into an English mode. The same is true of other foreign language word processing systems, where the user must explicitly state

the target language. The present invention eliminates this step, allowing the user to type in English or Romaji as needed, with the system automatically distinguishing between the two and converting the Romaji to Kanji as necessary. In a mixed-language document, this regular expression can be used to select the appropriate dictionary and thesaurus for use with the word. It can also be used to select the appropriate spelling correction and grammar correction algorithms. Kantrowitz also teaches the method of recognizing the language of a single word has applications to spelling and grammar correction (e.g., identifying the appropriate language resources on a document, paragraph, sentence or even individual word basis), the automatic invocation of transliteration software based on the language of the words (e.g., automatic ASCII to Kanji substitution without requiring the user to explicitly switch into a Kanji mode), the automatic invocation of appropriate machine translation tools when the document's language is different from the user's native tongue(s), the use of document language identification to eliminate from database or web search results any documents which are not written in the user's native languages and the automatic identification of user-appropriate languages for the user interface.

Additionally, Kantrowitz teaches that the present invention determines whether or not a word is in the lexicon of a specific language. It is possible that a word may satisfy the recognizer (statement of n-gram patterns) for more than one language, using multiple parallel recognizers for specific languages, we can identify the languages to which the word belongs. If a word matches several recognizers, one can either weigh each language equally or use the language of the words on the left and right to

disambiguate the possibilities. For example, if both neighboring words are English and the current word is recognized as being both English and Japanese, the current word would be deemed to be English. On the other hand, if one of the neighboring words was Japanese, both English and Japanese would be reported.

Further, Kantrowitz teaches that the invention goes beyond the state of the art by being able to identify the language of individual words in isolation with high accuracy. The accuracy in identifying the language of individual words typically is equal to that of whole-document language identification systems. When the language identification of individual words is combined for all the words in a document, the overall accuracy significantly exceeds that of whole-document systems. Moreover, the ability to identify the language of individual words permits document processing resources to be applied on a word-by-word basis. For example, it allows for the spelling correction of a mixed-language document, allowing the spelling correction software to select the appropriate language for each word. It also allows the automatic substitution of Kanji for Romaji in mixed Japanese-English documents, without requiring the user to explicitly switch from one language to another. This invention is not limited to comparing only two languages. First, a collection of regular expressions for pair wise distinguishing languages can be used to identify the language of a word. Moreover, lexicons of multiple languages could be merged to distinguish, for example, English words from the words present in any one of a dozen other languages.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention converting a mixed language word sequence to a monolingual

word sequence. Using word prediction and probabilities relative to a mixed language allows for an interface that enables a multilingual user to input a language that may have two or more mixed languages. The ability to model a mixed language text allows for multiple languages in one text to be distinguished from one another, without translation from one language to another, where automatic substitution of words occurs through the use of various lexicons. Additionally, lexicons may be merged to allow for an increased capability of modelling additional languages mixtures for the purpose of predicting a more versatile selection of adjacent words in a text.

Re claims 5, 13, and 19, Bahl teaches the method as claimed in claim 1, further comprising the step of determining the word equivalence probabilities (Page 1001 Col. 2).

a parallel text corpus that has corresponding expressions in the first language and the at least one other language (Kantrowitz Col. 6 lines 7-64).

Bahl teaches that all current Japanese word processing systems require the user to explicitly switch from a Japanese mode into an English mode. The same is true of other foreign language word processing systems, where the user must explicitly state the target language. The present invention eliminates this step, allowing the user to type in English or Romaji as needed, with the system automatically distinguishing between the two and converting the Romaji to Kanji as necessary. In a mixed-language document, this regular expression can be used to select the appropriate dictionary and thesaurus for use with the word. It can also be used to select the appropriate spelling

correction and grammar correction algorithms. Kantrowitz also teaches the method of recognizing the language of a single word has applications to spelling and grammar correction (e.g., identifying the appropriate language resources on a document, paragraph, sentence or even individual word basis), the automatic invocation of transliteration software based on the language of the words (e.g., automatic ASCII to Kanji substitution without requiring the user to explicitly switch into a Kanji mode), the automatic invocation of appropriate machine translation tools when the document's language is different from the user's native tongue(s), the use of document language identification to eliminate from database or web search results any documents which are not written in the user's native languages and the automatic identification of user-appropriate languages for the user interface.

Additionally, Kantrowitz teaches that the present invention determines whether or not a word is in the lexicon of a specific language. It is possible that a word may satisfy the recognizer (statement of n-gram patterns) for more than one language, using multiple parallel recognizers for specific languages, we can identify the languages to which the word belongs. If a word matches several recognizers, one can either weigh each language equally or use the language of the words on the left and right to disambiguate the possibilities. For example, if both neighboring words are English and the current word is recognized as being both English and Japanese, the current word would be deemed to be English. On the other hand, if one of the neighboring words was Japanese, both English and Japanese would be reported.

Further, Kantrowitz teaches that the invention goes beyond the state of the art by being able to identify the language of individual words in isolation with high accuracy. The accuracy in identifying the language of individual words typically is equal to that of whole-document language identification systems. When the language identification of individual words is combined for all the words in a document, the overall accuracy significantly exceeds that of whole-document systems. Moreover, the ability to identify the language of individual words permits document processing resources to be applied on a word-by-word basis. For example, it allows for the spelling correction of a mixed-language document, allowing the spelling correction software to select the appropriate language for each word. It also allows the automatic substitution of Kanji for Romaji in mixed Japanese-English documents, without requiring the user to explicitly switch from one language to another. This invention is not limited to comparing only two languages. First, a collection of regular expressions for pair wise distinguishing languages can be used to identify the language of a word. Moreover, lexicons of multiple languages could be merged to distinguish, for example, English words from the words present in any one of a dozen other languages.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention using word histories and probabilities for statistical purposes using parallel identifiers for specific languages relative to a lexicon/corpus, where the next word in a mixed language text can be predicted. Using word prediction and probabilities relative to a mixed language allows for an interface that enables a multilingual user to input a language that may have two or more mixed languages. The ability to model a

mixed language text allows for multiple languages in one text to be distinguished from one another, without translation from one language to another, where automatic substitution of words occurs through the use of various lexicons. Additionally, lexicons may be merged to allow for an increased capability of modelling additional languages mixtures for the purpose of predicting a more versatile selection of adjacent words in a text.

Re claims 6, 14, and 20, Bahl teaches the method as claimed in claim 1, further comprising the step of determining a probability of a next word (Page 1002 Col. 2) hypothesis given a base language word history (Page 1001 Col. 2).

However, Bahl fails to teach probabilities of a foreign language given a base language (Kantrowitz Col. 6 lines 7-64).

Bahl teaches that all current Japanese word processing systems require the user to explicitly switch from a Japanese mode into an English mode. The same is true of other foreign language word processing systems, where the user must explicitly state the target language. The present invention eliminates this step, allowing the user to type in English or Romaji as needed, with the system automatically distinguishing between the two and converting the Romaji to Kanji as necessary. In a mixed-language document, this regular expression can be used to select the appropriate dictionary and thesaurus for use with the word. It can also be used to select the appropriate spelling correction and grammar correction algorithms. Kantrowitz also teaches the method of recognizing the language of a single word has applications to spelling and grammar

correction (e.g., identifying the appropriate language resources on a document, paragraph, sentence or even individual word basis), the automatic invocation of transliteration software based on the language of the words (e.g., automatic ASCII to Kanji substitution without requiring the user to explicitly switch into a Kanji mode), the automatic invocation of appropriate machine translation tools when the document's language is different from the user's native tongue(s), the use of document language identification to eliminate from database or web search results any documents which are not written in the user's native languages and the automatic identification of user-appropriate languages for the user interface.

Additionally, Kantrowitz teaches that the present invention determines whether or not a word is in the lexicon of a specific language. It is possible that a word may satisfy the recognizer (statement of n-gram patterns) for more than one language, using multiple parallel recognizers for specific languages, we can identify the languages to which the word belongs. If a word matches several recognizers, one can either weigh each language equally or use the language of the words on the left and right to disambiguate the possibilities. For example, if both neighboring words are English and the current word is recognized as being both English and Japanese, the current word would be deemed to be English. On the other hand, if one of the neighboring words was Japanese, both English and Japanese would be reported.

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whole-document language identification systems. When the language identification of individual words is combined for all the words in a document, the overall accuracy significantly exceeds that of whole-document systems. Moreover, the ability to identify the language of individual words permits document processing resources to be applied on a word-by-word basis. For example, it allows for the spelling correction of a mixed-language document, allowing the spelling correction software to select the appropriate language for each word. It also allows the automatic substitution of Kanji for Romaji in mixed Japanese-English documents, without requiring the user to explicitly switch from one language to another. This invention is not limited to comparing only two languages. First, a collection of regular expressions for pair wise distinguishing languages can be used to identify the language of a word. Moreover, lexicons of multiple languages could be merged to distinguish, for example, English words from the words present in any one of a dozen other languages.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention using word histories and probabilities for statistical purposes using parallel identifiers for specific languages relative to a lexicon/corpus, where the next word in a mixed language text can be predicted. Using word prediction and probabilities relative to a mixed language allows for an interface that enables a multilingual user to input a language that may have two or more mixed languages. The ability to model a mixed language text allows for multiple languages in one text to be distinguished from one another, without translation from one language to another, where automatic substitution of words occurs through the use of various lexicons. Additionally, lexicons

may be merged to allow for an increased capability of modelling additional languages mixtures for the purpose of predicting a more versatile selection of adjacent words in a text.

Re claims 7, 15, and 21, Bahl fails to teach the method as claimed in claim 1, further comprising the step of using a parallel text corpus that has corresponding expressions in the first language and the at least one other language (Kantrowitz Col. 6 lines 7-64)

Bahl teaches that all current Japanese word processing systems require the user to explicitly switch from a Japanese mode into an English mode. The same is true of other foreign language word processing systems, where the user must explicitly state the target language. The present invention eliminates this step, allowing the user to type in English or Romaji as needed, with the system automatically distinguishing between the two and converting the Romaji to Kanji as necessary. In a mixed-language document, this regular expression can be used to select the appropriate dictionary and thesaurus for use with the word. It can also be used to select the appropriate spelling correction and grammar correction algorithms. Kantrowitz also teaches the method of recognizing the language of a single word has applications to spelling and grammar correction (e.g., identifying the appropriate language resources on a document, paragraph, sentence or even individual word basis), the automatic invocation of transliteration software based on the language of the words (e.g., automatic ASCII to Kanji substitution without requiring the user to explicitly switch into a Kanji mode), the

automatic invocation of appropriate machine translation tools when the document's language is different from the user's native tongue(s), the use of document language identification to eliminate from database or web search results any documents which are not written in the user's native languages and the automatic identification of user-appropriate languages for the user interface.

Additionally, Kantrowitz teaches that the present invention determines whether or not a word is in the lexicon of a specific language. It is possible that a word may satisfy the recognizer (statement of n-gram patterns) for more than one language, using multiple parallel recognizers for specific languages, we can identify the languages to which the word belongs. If a word matches several recognizers, one can either weigh each language equally or use the language of the words on the left and right to disambiguate the possibilities. For example, if both neighboring words are English and the current word is recognized as being both English and Japanese, the current word would be deemed to be English. On the other hand, if one of the neighboring words was Japanese, both English and Japanese would be reported.

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on a word-by-word basis. For example, it allows for the spelling correction of a mixed-language document, allowing the spelling correction software to select the appropriate language for each word. It also allows the automatic substitution of Kanji for Romaji in mixed Japanese-English documents, without requiring the user to explicitly switch from one language to another. This invention is not limited to comparing only two languages. First, a collection of regular expressions for pair wise distinguishing languages can be used to identify the language of a word. Moreover, lexicons of multiple languages could be merged to distinguish, for example, English words from the words present in any one of a dozen other languages.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention using a parallel text corpora corresponding to a first and another language. Using word prediction and probabilities relative to a mixed language allows for an interface that enables a multilingual user to input a language that may have two or more mixed languages. The ability to model a mixed language text allows for multiple languages in one text to be distinguished from one another, without translation from one language to another, where automatic substitution of words occurs through the use of various lexicons. Additionally, lexicons may be merged to allow for an increased capability of modelling additional languages mixtures for the purpose of predicting a more versatile selection of adjacent words in a text.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure US 6668243 B1, US 7120582 B1, US 6167369 A, US 5878390 A, US 5903867 A, US 5083268 A, US 7072826 B1, US 5526259 A, US 6014615 A, US 7171351 B2, US 7194455 B2, US 7216072 B2.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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